

CASA GRANDE MUNICIPAL AIRPORT MASTER PLAN

CHAPTER 2 - FORECASTS

2.1 FORECASTS

The basis for determining airport facility requirements are the airport's present and forecast aviation activities. Present and forecast aviation activities are used to plan future airport developments such as tiedown / apron areas, hangar spaces, and runway / taxiway dimensions and pavement strength requirements.

In May of 1996, an airport activity survey was sent to 274 owners of aircraft based at the Casa Grande Municipal Airport and in Pinal County, and other frequent users of the airport. This vehicle was used to help quantify current and future airport use and to enhance validity of the forecast.

The information available for forecasting is limited and not considered extremely reliable, therefore other methods of forecasting were implemented. In this case, the 1988 Coffman and Associates Casa Grande Master Plan Update; the 1995 Arizona State Aviation Needs Study (SANS) by Bucher, Willis, & Ratliff and the April 1995 Federal Aviation Administration (FAA) National Plan of Integrated Airport Systems (NPIAS) 1993-1997 were consulted in an effort to maximize available data from which the forecasts were derived.

This Chapter will utilize two techniques to illustrate the future growth of the Casa Grande Municipal Airport. The first forecast will be made for based aircraft utilizing a correlation of based aircraft to population growth. The second forecast will illustrate the growth of the airport usage or operations, by correlating operations to the based aircraft forecasts.

The following table illustrates the historic based aircraft of Casa Grande Airport and also shows a comparison to the registered aircraft in Pinal County.

TABLE 2.1					
	1975	1980	1985	1990	1996
Based Aircraft (Avg. Annual percent change)	29 (-)	30 (0.7)	34 (2.7)	45 (6.5)	52 (3.1)
Registered Aircraft in Pinal County (Avg. Annual percent change)	140 (-)	175 (5.0)	194 (2.2)	245 (5.2)	194 (-4.1)

Source: Arizona Department of Transportation, 1995 State Aviation Needs Study
Casa Grande Municipal Airport Master Plan, 1988

2.2 BASED AIRCRAFT FORECAST

Based Aircraft are those airplanes which are permanently stationed at an airport, usually by some form of agreement between the aircraft owner and airport management. Aircraft registration is required of all active aircraft. Because FAA records of registered aircraft are by address of the owner as opposed to the based location of the aircraft, it is possible that the number of aircraft based in Pinal County differs from the number of registered aircraft.

Sources do not agree on the number of aircraft based at Casa Grande Municipal Airport: The 1995 SANS places the number of based aircraft at 45. The FAA Form 5010 (dated May 1995) indicates there are 29 aircraft based at CGMA. Discussions with the Airport Board and a verification count conducted in May 1996 by Morrison-Maierle/CSSA indicates there are 52 aircraft based at CGMA. To verify the number of based aircraft, a count was conducted of the hangars occupied (42), and a confirmation was completed of the number of people that are waiting for hangars(12) for a total of 54. For the purpose of this study, the MM/CSSA count of 52 will be used as the 1996 base.

TABLE 2.2				
	FAA Form 5010 (May 95)	ADOTAD Data Base (May 95)	ADOTAD Data Base (January 96)	MM/CSSA (May 96)
Casa Grande Municipal	29	40	43	52

Source: FAA Form 5010 Data Base
Arizona Department of Transportation - Aeronautics Division (ADOTAD) State Aviation Needs Study 1995
Arizona Department of Transportation - Aeronautics Division (ADOTAD) Airport Data Base 1996
Morrison-Maierle/CSSA physical count May 1996

Note: Based Aircraft includes Single Engine and Multiple Engine, Helicopters are not included.

TABLE 2.3								
FORECAST BASED AIRCRAFT - CASA GRANDE								
	1996	1997	1998	1999	2000	2001	2006	2016
GAMA Growth Rate ^α	52	52	53	53	53	54	*	*
SANS Growth Rate ^β	52	52	53	54	54	55	60	65
Pinal County Growth Rate ^γ	52	53	55	56	57	58	64	78

^α This is the growth rate specified in the **General Aviation Statistical Handbook**, 1993 Edition, published by the General Aviation Manufacturers Association (GAMA). This reflects an average annual growth of 0.6 % nationwide. Estimates not available for 2006 or 2016.

^β Growth rate used by the ADOTAD to estimate the number of based aircraft at CGMA and applied to the observed number of based aircraft. This reflects an average annual growth of 1.3 % for the until 2000, 1.6 % until 2005, and 0.8 % until 2016.

^γ This estimate is based on the projected population growth of Pinal County, from Population Projections 1995-2045, by the Arizona Department of Economic Security, Population Statistic Unit, February 1995.

Table 2.3 illustrates the projected based aircraft population using three different growth rates. The first growth rate is that which the General Aviation Manufacturers Association (GAMA) uses to forecast the growth of active aircraft nationwide. This is included to make a general comparison to the national trend. The second estimate utilizes the growth rate that Arizona Department Of Transportation Aeronautics Division (ADOTAD) used in the 1995 SANS. The third estimate uses the growth rate projected by the Arizona Department of Economic Security for the overall population of Pinal County. Although it is not shown above, review of the referenced data demonstrates a strong statistical correlation between the historical growth of population of Pinal County and the historical growth of based aircraft population. The linear regression analysis conducted compared the historic growth rate of based aircraft to the population growth of Casa Grande and Pinal County. Since the correlation was better between with the County growth, it was chosen for this forecast. All three estimates use the Morrison-Maierle/CSSA estimate from May 1996 as the base.

2.3 ANNUAL AIRCRAFT OPERATIONS FORECAST

Any aircraft movement on a runway such as landing, a take-off, or a touch-and-go is considered an aircraft operation. The number of operations rather than the number of flights or trips determines the level of airport activity. Table 2.4 illustrates local, itinerant and total operations, both historical and forecast using the historical Pinal County population growth as a basis for future projection.

Local itinerant operations are expected to remain reasonably stable through the planning period. It is important to note that the three airport users, in terms of operations, who were mentioned in the 1987 Master Plan report; States West Airline, AmericaWest Airlines, and Airline Training Center, no longer use Casa Grande Municipal to the degree they once did. However, other unidentified users have increased their use of the facilities.

TABLE 2.4					
ANNUAL OPERATIONS CASA GRANDE (Thousands)					
	1987	1996	2001	2006	2016
Local Operations	52.4	52.4	58.0	64.0	78.0
Itinerant Operations	11.6	13.0	14.5	16.0	19.5
Military Operations	8.0	8.0	8.0	8.0	8.0
Total Estimated Operations	72.0	73.5	80.5	88.0	104.5

Note: Itinerant Operations include Air Taxi and Commuter.

2.4 LOCAL OPERATIONS FORECAST

A Local Operation is considered a touch and go and other training operation in which the aircraft does not leave the immediate vicinity of the airport.

Studies conducted by the FAA indicate that the number of general aviation local operations per based aircraft at non-towered airports varies from a typical low of 170 operations per year, to a median of 375 operations per year, with the typical high being 690 operations per year (Airport Engineering, 2nd Edition, 1984, Ashford & Wright, Wiley Publication pg. 50).

However, because CGMA has an ILS used for training purposes, a much higher ratio of local operations to based aircraft is actually realized. In 1987, this ratio was 1,164 local operations per based aircraft. In this study the median ratio is 1,000 local operations per based aircraft. The low estimate is based on 850 local operations per based aircraft, the high estimate is based on 1,150 local operations per based aircraft.

Table 2.5 indicates the range of forecast for local operations at the Casa Grande Municipal Airport using FAA data and forecast based aircraft.

TABLE 2.5				
LOCAL OPERATION FORECAST				
FORECAST OPERATIONS PER YEAR				
YEAR	Based Aircraft (BA)	LOW (850/BA)	MEDIAN (1,000/BA)	HIGH (1,150/BA)
1996	52	44,200	52,000	59,800
2001	58	49,300	58,000	66,700
2006	64	54,400	64,000	73,600
2016	78	66,300	78,000	89,700

Based on FAA Surveys
BA: Forecast Based Aircraft from Table 2.2.

2.5 ITINERANT OPERATIONS FORECAST

An itinerant operation constitutes all aircraft operations except touch and go and training operations.

FAA surveys indicate that at non-towered airports the number of general aviation itinerant operations per based aircraft vary from a typical low of 125 per year, to a median of 210 per year, with the typical high being 450 operations per year.

Again, these ratios are traditionally higher at CGMA, thought to be due to seasonal population fluctuations. The low estimate is based on 150 itinerant operations per based aircraft, the median is 250, and the high estimate is 500 itinerant operations per based aircraft.

Table 2.6 indicates the range of forecasts for itinerant operations using FAA data and forecast based aircraft.

TABLE 2.6				
ITINERANT OPERATIONS FORECAST				
FORECAST OPERATIONS PER YEAR				
YEAR	Based Aircraft (BA)	LOW (150/BA)	MEDIAN (250/BA)	HIGH (500/BA)
1996	52	7,800	13,000	26,000
2001	58	8,700	14,500	29,000
2006	64	9,600	16,000	32,000
2016	78	11,700	19,500	39,000

Based on FAA Surveys (AC 150/5300 - 4B page 49)
BA: Forecast Based Aircraft from Table 2.2.

2.6 TOTAL OPERATIONS FORECAST

Total operations at the Casa Grande Municipal Airport were forecast by adding together the local and itinerant forecasts based on FAA surveys for low (295), median (585) and high (1,140) conditions (Table 2.7).

These forecasts indicate a wide range of between 1,000 and 1,650 operations per year per based aircraft. Historically, the level of operations at Casa Grande falls between the median and high level forecast. Therefore, the high forecast is the preferred forecast, since it illustrates a more conservative forecast.

TABLE 2.7				
TOTAL OPERATIONS				
FORECAST OPERATIONS PER YEAR				
YEAR	Based Aircraft (BA)	LOW (1,000/BA)	MEDIAN (1,250/BA)	HIGH (1,650/BA)
1996	52	52,000	65,000	85,800
2001	58	58,000	72,500	95,700
2006	64	64,000	80,000	105,600
2016	78	78,000	97,500	128,700

Based on FAA Surveys (Tables 13 & 14, above)
BA: Forecast Based Aircraft from Table 2.4.

2.7 USER SURVEYS

In May of 1996, an airport users survey was forwarded to aircraft owners in Pinal County and other frequent users of the airport, and requested information regarding operational forecasts, aircraft used, enplanement forecasts and economic impact data. Of the 274 surveys mailed, a total of 15 responses to the survey were received. The response indicates a 5.5% return rate of the total mailed. The survey was also published in the Arizona Flyways Newsletter with a circulation of approximately 3000, of which one survey was returned. As predicted, the direct mailing method provided a much higher rate response. Although the rate of return for the questionnaires seems low, the response is consistent with other surveys conducted for this type of study at a general aviation airport. The response to the survey, although somewhat limited, provides a useful tool for identifying aircraft usage and future demands. The following table provides a list of aircraft frequently using CGMA.

TABLE 2.8				
AIRPLANES FREQUENTLY USING THE CASA GRANDE AIRPORT				
TYPES/ MOD- ELS	Aircraft Ref- erence Code	Average Trip Length (Miles)	Approx. Number of Operations per Year	Average Num- ber of Passen- gers per Trip
Lear 31A	C-1	350	26	4
Cessna 150 172 180 182 210 310 340 414 421 402	A-I A-I A-I A-I A-I A-I A-I B-I B-I B-I	100 120 140 150 300 160 100 160 160 160	5 28 52 25 20 90 95 90 90 90	1 1.8 2 1.7 2 2 2 2 2 2
Champion 7EC	A-I	50	60	2
King Air C90 100 200	B-II B-II B-II	160 160 160	50 50 50	2 2 2
Piper PA-18 Super Cub	A-I	95	11	1.3
Others*	A-I	50	2000	1

Source: Responses to Users Survey, February 1992 and May 1994. * Spray planes account for all operations under others.

2.8 CRITICAL AIRCRAFT

Federal interest in funding airport development is influenced by the operation of the **critical aircraft** using the facility. Critical aircraft are considered to be those aircraft routinely using the airport facility which because of their size and capacity, require the greatest facility considerations, (ie. runway length, runway width, separation distances, etc.). Generally, ten operations per week of the critical aircraft (520 annual operations) determines the type of airport needed.

Once the critical aircraft is known, the Airport Reference Code (ARC) may be determined, and the design criteria associated with that ARC applied to the design of airport facilities. The ARC is a coding system used to relate airport design criteria to the operational and physical characteristics of the airplanes intended to operate at the airport. FAA Advisory Circular 150/5300-13, entitled "*Airport Design*" indicates that the ARC has two components relating to the critical aircraft. The first component is the **aircraft approach category**, which relates to aircraft approach speed. The second component is the **airplane design group**, which relates to airplane wingspan.

The "Aircraft Approach Category" is a grouping of aircraft based on 1.3 times their stall speed in their landing configuration at the maximum certificated landing weight. The categories are as follows:

Category A: Speed less than 91 knots;

Category B: Speed 91 knots or more but less than 121 knots;

Category C: Speed 121 knots or more but less than 141 knots;

Category D: Speed 141 knots or more but less than 166 knots.

The "Airplane Design Group" is a grouping of aircraft based on wingspan. The groups are as follows:

Airplane Design Group I: Wingspans up to but not including 49 feet;

Airplane Design Group II: Wingspans 49 feet up to but not including 79 feet;

Airplane Design Group III: Wingspans 79 feet up to but not including 118 feet.

The users survey, site visits, and conversations with FBO's indicates that the Casa Grande Municipal Airport is used almost exclusively by small (12,500 lbs. or less maximum takeoff weight) Design Group I, Approach Category A and B aircraft. The airport is also used by Design Group II aircraft. The most demanding aircraft based at Casa Grande currently is a Cessna 182 (maximum takeoff weight 2,950 lbs., ARC A-I). The users survey for this study indicates a present need and use of the existing facilities which will accommodate B-II aircraft. The B-II aircraft have been increasing in use by business concerns, such as cargo operations including UPS, mail and check hauling operations and air ambulance operators. The previous master plan study and Airport Layout Plan identified the current critical aircraft as and ARC C-II aircraft. However, based on the information that has been accumulated, it appears that a current ARC C-II is not justified and therefore this study recommends that the ARC B-II be utilized as the existing critical aircraft.

Based on our assessment of the economic environment at Casa Grande, the potential for manufacturing/corporate growth and personal observation, conditions are favorable for corporate jet use. Additionally, several businesses that have indicated an interest in locating at Casa Grande provided adequate runway length is provided for D-II aircraft. This information should be confirmed by correspondence indicating a commitment to basing a larger corporate jet such as a Gulfstream G-IV at the airport. This commitment would provide a strong basis for providing additional infrastructure for the larger corporate jets.

The previous master plan identified the ARC of the future critical aircraft as ARC C-III, this may have been selected due to the use of CGMA for training flights for larger commercial aircraft such as the Boeing 737. However, this activity has since ended. Recent correspondence with the airlines, little or no desire to use the airport for large aircraft training flights.

Therefore, considering the above mentioned conditions and plans, we recommend that the future ARC for the Casa Grande Municipal Airport be a D-II. This recommendation is reinforced by the existence of the ILS, which is commonly utilized for training purposes for the metropolitan Phoenix vicinity which is experiencing an increase of training flights for corporate jet type aircraft. The ILS may not be additional justification for the recommendation, however, a business that utilizes this type of corporate jet is more likely to locate their business at a location that has an ILS than locating at an airport that does not. Although the aircraft may not be based at CGMA, at this time, there is a need to plan for adequate runway length and infrastructure to accommodate landings and takeoffs by this type of aircraft. Although the large majority of corporate aircraft fall into the ARC C-II category, there is not a significant difference in the dimensional design standards between the C-II and D-II aircraft. Therefore, the more conservative choice is to select the ARC D-II aircraft as the design aircraft. This will allow the consideration of a heavier pavement strength when the runway extension occurs or other pavement rehabilitation. At the time runway pavement designs are under consideration, the pavement design should take into consideration the design weight of the D-II aircraft. Although the aircraft use at the time of design, may not justify the weights of the larger aircraft, consideration should be given to the heavier weights as a phased construction alternative, by utilizing a pavement overlay to provide the required strength at a future date when there is adequate justification. To plan for the smaller and lighter aircraft as the ultimate critical aircraft, would be short sighted.

The type of approach procedure utilized at the facility (ie. visual, non-precision instrument, or precision instrument) must also be considered when determining the applicable design criteria.

Visual Runway is a runway solely intended for the operation of aircraft using visual approach procedures, with no straight-in instrument approach procedure and no instrument designation indicated on an FAA approved airport layout plan, or on other planning documents.

Non-precision Instrument Runway is one with an instrument approach procedure utilizing air navigation facilities, with only horizontal guidance, or area type navigation equipment for which straight-in non-precision instrument approach procedure has been approved or planned and no precision approach facility or procedure is planned or indicated on an FAA approved airport layout plan or other planning document.

Precision Instrument Runway is one with an instrument approach procedure utilizing a conventional instrument landing system (ILS), global positioning system (GPS), microwave landing system (MLS), or precision approach radar (PAR). A planned precision instrument runway is one which a precision approach system or procedure is indicated on an FAA approved airport layout plan or other approved planning document.

Casa Grande Municipal Airport facilities does include an ILS, and a published ILS precision instrument approach exists at the airport. The Airport also has a published, non-precision approach with a GPS overlay.

2.9 PEAKING CHARACTERISTICS

Peaking characteristics are a critical element in forecasting and the study of demand and capacity study of busy airports such as large commercial service sites. The capacity analysis study conducted as part of the 1995 Arizona State Aviation Needs Study indicates that the airport is at 27% capacity, which indicates that unless there is a substantial increase in operations, peak traffic will not effect the capacity of the airport. The master plan study completed in 1988 for the Casa Grande Municipal Airport conducted a one month count of aircraft activity. The count indicated that peak usage occurs in February, mid-week, between 8:00 AM and 4:00 PM with the peak usage in the morning at about 8:00 AM and another peak occurs at about 3:00 PM. It is unlikely that this trend has changed since 1988 and a new study would probably reveal the same results. A comparison of peak usage to fuel sales, indicates that the highest monthly average fuel sales for AVGAS occurs in March and for Jet Fuel the highest average is in April. Therefore, unless a more accurate count is conducted the assumption that peak monthly traffic occurs in March would be most appropriate.

Unless the operations of the airport substantially change in the future, the assumptions and estimate of peaking characteristics will remain unchanged during the term of this study.

2.10 SUMMARY

The forecasts of this section indicate a slow but steady growth for the Casa Grande Municipal Airport, which is consistent with the forecasts for population and economic growth for the City and County. Operations and based aircraft forecasts could change substantially when a new business locates at the airport if an aircraft is utilized as a means of conducting business.

A comparison was conducted to determine if historic fuel sales would correlate with the growth in operations, however, this did not indicate any significant trend that could be tied to future growth at the airport.

Due to the potential for future corporate aircraft use, the current ILS and the anticipated increasing operations, the recommended Airport Reference Code is D-II. The design criteria for future development includes using precision instrument runway geometry with approach minimums at less than 3/4 mile.